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National Laboratory

LANSCE Division ES&H
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LANSCE Facility Implementing Requirement

Technical & Safety Review of User Experiments at LANSCE

53FIR 300-00-01.0

Effective date: August 6, 1999

APPROVALS

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LANSCE-3

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Reviewed by: _____ **Date:** _____
C. John Graham
LANSCE Division Safety Officer

Approved by: _____ **Date:** _____
Roger Pynn
LANSCE Division Director

1.0 Introduction

It is LANSCE Division policy to conduct work in accordance with the principles of Integrated Safety Management (ISM) and the Laboratory's Safe Work Practices (SWP) processes. This Experiment Review Procedure, intended for use with all user experiments associated with the accelerator-complex, provides a thorough review of all aspects of experimental processes, interfaces and supports ISM and SWP in authorization of both work and workers.

2.0 Purpose and Scope

In order to protect personnel and the environment and meet the requirements of the DOE Accelerator Safety Order (5480.25/420.2), LANSCE requires a documented experiment safety review of all beam-related experimental activities. This document describes the LANSCE Experiment Safety Review process.

All experiments will be reviewed and authorized prior to receiving beam. Ongoing experiments will be reviewed at appropriate intervals (e.g., every proposal cycle) or whenever there is a significant change to the experiment. This ensures that incremental changes to an experimental apparatus such as target samples, sample environments, detectors, etc., are still within the previously approved safety envelope.

Accelerator development tests, modifications to the accelerator facility or safety procedures, new types of activities, or activities that may exceed the approved facility safety envelope may require review through the Unreviewed Safety Issues Determination (USID) process as outlined in 53 FMS 114-02.01 "Determination of Unreviewed Safety Issues." DOE must approve activities involving an increase in risk (positive USI determination) prior to implementation.

Area Managers and experimenters should consult LANL authorization basis requirements or the LANSCE Safety Manager for guidance for any proposal involving activities/facilities that may be categorized as nuclear per DOE STD 1027. Nuclear activities require DOE authorization and are subject to the USQD process.

3.0 Definitions

Screener — person designated by the responsible Group Leader to conduct an initial review of the experiment safety information submitted. The Screener assigns an appropriate experiment review level (see definition below).

Technical review — addresses issues involving experiment feasibility, facility interfaces, required resources, and operating parameters that affect scheduling.

Safety review — addresses ES&H aspects of the experiment setup, design, and operation. The review includes, but is not limited to, hazard, interface, and compliance issues with respect to:

- Radiological control
- Nuclear Material
- Industrial safety
- Waste generation and disposal
- Hazardous materials
- Air emissions
- Industrial hygiene
- Housekeeping
- Required training

Experiment Review Level — is the level of review deemed by the assigned screener to be adequate. It is determined by considering all established controls including HCPs previously approved in accordance with LANL Safe Work Practices (SWP) requirements. Previous review under this procedure should also be considered. Care must be exercised to include interface issues, interactions with other activities, and hazards specific to the proposed work areas.

Low - review by assigned screener is adequate
Medium - reviewed by committee with SME consultation
High - reviewed by committee with SME concurrence

4.0 Responsibilities

Who?	Responsibility
Experimenter(s)	• Prepare the Experiment Proposal Form found in Appendix B (for material science experiments using existing instruments at the Lujan Center with approved HCPs for operation) **OR** a Technical and Safety Review Worksheet found in Appendix C (for all other experiments). • Obtain permits for work (e.g. Radiological Work Permits), if required. • Ensure that personnel involved in the work are familiar with hazards and hazard controls for the work and that they understand their responsibilities for hazard control. • PIs are responsible for ensuring that participating workers have been authorized and are properly trained. • Ensure that changes to the experiment configuration or procedures that may affect safety are communicated to the Instrument Responsible prior to implementation in order to ensure continued adequacy of hazard controls. • Notify workers of changes in hazards and controls.
Screener	• Determine an appropriate experiment review level by considering all established controls including HCPs previously approved in accordance with LANL Safe Work Practices (SWP) requirements. Previous review under this procedure should also be considered. Care must be exercised to include interface issues, interactions with other activities, and hazards specific to the proposed work areas.

Instrument Responsible	• Insures that hazard controls are implemented as specified and experiments are conducted within the approved safety envelope. • Document experiment changes, ensure the changes are communicated to affected personnel, and determine if the changes require a new safety review.
Experimental Area Managers	• Organize an Experiment Safety Review Committee for experiments assigned a medium or high review level by the screener. • When acting as Chairperson of the Experiment Safety Review Committee, determine the residual risk of the experiment. • Concur with experiment changes that may affect other activities or personnel in the area.
Responsible Group Leader	• Authorize experiments assigned a residual risk no higher than low.
Experiment Safety Review Committee	• Advise on training, safety procedures, or additional hazard controls deemed necessary to adequately reduce the risk before the experiment is allowed to proceed.

5.0 Precautions and Limitations

If operating instructions, checklists, permits or other specific procedures are required to implement hazard controls and ensure the safety of operations, they shall be attached to the Experiment Proposal Form or Technical and Safety Review Worksheet.

6.0 Standard Requirements

Safety Review Procedure

Experiment information

- All experimenters must provide safety information on their experiments.
- Experiment safety information for material science experiments using existing instruments at the Lujan Center that have approved HCPs for operation, is submitted on the Experiment Proposal Form (Appendix A) to the LANSCE User Office.
- All other experiments must submit a Technical and Safety Review Worksheet (TSRW) (Appendix B) to the LANSCE User Office.

Low Experiment Review Level - Initial Safety Screening and Approval

- LANSCE Division assigns responsibility for flight paths and areas where experiments are conducted. The responsible Group Leader shall ensure that all experiments conducted in their assigned areas are reviewed in accordance with this procedure and designates a screener to review the safety information on each experiment.
- Following the review of the experiment information, the screener shall assign an experiment review level (see above definition).
- New experiments that involve standard equipment and non-hazardous targets such that the initial risks are minimal or low may be assigned an experiment review level of low and be

recommended for approval by the reviewer without further evaluation. The SWP residual risk may be minimal or low. The responsible Group Leader that designated the reviewer may approve the experiment or delegate this authority as necessary.

- Experiments that are continuations from previous years and have documented and previously reviewed hazard management procedures may be assigned an experiment review level of low and also be recommended for approval without further review. The SWP assigned residual risk is assumed to be unchanged.
- See Appendix E for present area and responsibility assignments.

Medium and High Experiment Review Levels

- New or modified experiments with medium or high initial risks or deemed particularly complex or raise other concerns in the initial screening shall be assigned (by the screener) an experimental review level greater than low. For such cases, the Group Leader responsible, the Area Manager, or a designated alternate will organize an Experiment Safety Review Committee (ESRC).

Experiment Safety Review Committee

- The Experiment Safety Review Committee will consist of persons who are knowledgeable about safety issues and are not participants in the experiment.
- The ESRC will include:
  - the Area Manager and safety screener
  - SMEs or safety professionals with expertise relevant to identified hazards
  - cognizant LANL Groups
  - members from LANSCE Facility Management, if physical plant issues are involved
- The Committee Chairperson will be the Area Manager or a designated alternate. Experiment information will be distributed to the Review Committee for inspection and comment. The Committee Chairperson shall determine if a presentation to the committee by an experiment spokesperson regarding hazards and proposed controls is warranted. The committee may advise on training, safety procedures, or additional controls deemed necessary before the experiment is allowed to proceed. The Committee Chairperson determines the residual risk of the experiment and may identify items to be accomplished prior to approval. If necessary, additional meetings will be scheduled to resolve operational and safety issues.
- As with Safe Work Practices initial risk assignments, if the assigned Experiment Review Level is medium, consultation with ES&H subject-matter expert(s) and/or independent peer(s) is required. Similarly, an assignment of a High Experiment Review Level requires the concurrence of ES&H subject-matter expert(s) and independent peer(s).
- The Group Leader responsible for the flight path (or area) may authorize experiments with minimal or low residual risk, while experiments with medium residual risk will require approval of the LANSCE Division Director.

Worker Authorization
This document addresses experiment approval, not worker authorization. Worker authorization must come from a worker's line management. No LANL worker may perform work unless authorized. PIs are responsible for ensuring that participating workers have been authorized.

Performance Assurance
The Instrument Responsible shall insure that hazard controls are implemented as specified and experiments are conducted within the approved safety envelope.

LANSCE Experiment Safety Contacts

Persons listed below are available to advise on safety and operations. (All area codes are 505.)

Steve Wender	LANSCE-3 Group Leader	667-1344	wender@lanl.gov
Dick Werbeck	LANSCE-7 Group Leader	667-5680	rwerbeck@lanl.gov
Joey Donahue	LANSCE-7 Deputy Group Leader	667-2856	jdonahue@lanl.gov
Joyce Roberts	LANSCE-12 Group Leader	667-3629	joycer@lanl.gov
Roger Klaffky	LANSCE-12 Deputy Group Leader Lujan Center Area Manager	665-1666	klaffky@lanl.gov
Bruce Takala	LANSCE-3 Operations/Safety Officer WNR Area Manager	665-2029	takala@lanl.gov
Pete Encinias	LANSCE-12 Safety Officer	665-5718	encinias@lanl.gov

Some local ES&H subject-matter experts are listed at http://www.lansce.lanl.gov/lanscefm.

Training

All users must check with the LANSCE User Office prior to arrival at LANSCE. The User Office will ensure that they receive the required training and authorizations. Information on training is available at http://www.lansce.lanl.gov/training/53Train.htm.

- *TA-53 Site Specific Training* is required for unescorted access to TA-53. Short-term users may take an abbreviated, more specific version depending on the areas to be visited.
- *LANL General Employee Radiological Training* (GERT) is the minimum requirement for unescorted access to Controlled Areas (<5 mrem/hr, *e.g.*, ER-2, Target-4 Yard). This training is included in the TA-53 Site Specific Training and the TA-53 User Site Specific Training.
- *Restricted Area Access Training* is required for unescorted access to Target-2 (Blue Room).
- *Limited Access Area Training* is required for unescorted access to ER-1.
- *Radiation Worker I* training is required for unescorted access to Radiation Areas (>5 mrem/hr, *e.g.*, Blue Room and ER-1) and is also required to become an authorized user of LANSCE-3 radioactive sources. *Radiation Worker II* training may be required when the experiment involves the potential for radioactive contamination. Either type of Radiation Worker training satisfies *GERT* requirements. We recommend Radiation Worker training.

All training requires advance scheduling. The LANSCE User Office will schedule user/visitor training when contacted regarding a visit to LANSCE for experimental purposes. The User Office telephone number is (505) 665-1010.

Additional training may be required based on the experiment hazards. Examples of additional training are cryogen safety training, electrical safety training, confined space training, etc.

Safety Review Worksheet Instructions

The Safety Review Worksheet is available from the Internet in Rich Text Format through the user information link on the LANSCE web page at lansce.lanl.gov. You should be able to open the document within your preferred software package. If you have problems with the form, please call the LANSCE User Office at (505) 665-1010.

The Worksheet may be returned in electronic or paper form to the User Office. Electronic as an e-mail attachment is preferred. Supporting documents such as SOPs should be furnished in whatever form is most convenient, although electronic format is preferred. Be as complete as possible when filling out the worksheet. Use extra pages or additional space as necessary.

7.0 Required Records

Documentation

When all action items that have been required by the review have been completed, an Experiment Safety Approval Form (Appendix C) will be generated and sent to the Principal Investigator or a designated experiment spokesperson and kept on file in the LANSCE User Office for reference and audit purposes. This approval form with the submitted safety review sheet and other supporting documentation such as SOPs, HCPs, RWPs, etc., constitutes the authorization for conducting the experiment.

Change Control

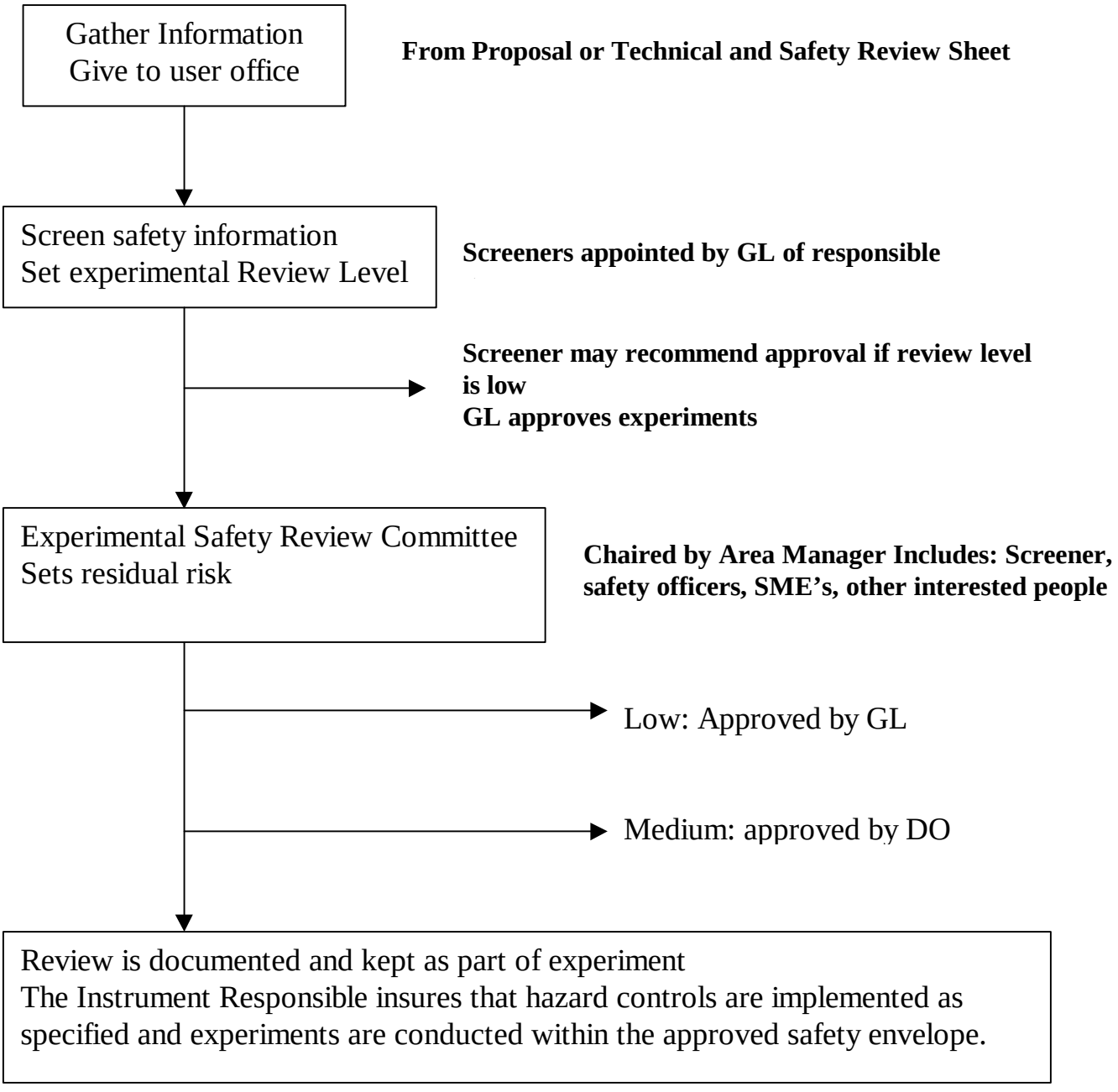
Should changes to the experiment configuration or procedures be necessary, an experiment spokesperson must make prior notification to the Instrument Responsible in order to ensure continued adequacy of hazard controls. The Instrument Responsible should document the changes, ensure the changes are communicated to affected personnel, and determine if the changes require a new review. The Area Manager must concur with changes that may affect other activities or personnel in the area.

8.0 References

LIR 300-00-01, Safe Work Practices
LDIR 300-00-01.0, Implementation of Safe Work Practices
DOE 420.2, Accelerator Safety Order
LANSCE Division Facility Safety Plan

Experiment Review Process Flowchart

LANSCE Div. assigns responsibility for flight paths and experimental areas



LANSCE Experiment Proposal Form

Program Advisory Subcommittees		*(To be completed by LANSCE)*	
☐ Neutron Scattering **(Non-defense)**	☐ Basic Nuclear/Particle Physics	**Proposal Number**	**Date Received**
☐ Neutron Scattering **(Defense)**	☐ Nuclear Technology		
	☐ Nuclear Science **(Defense)**		

TITLE	☐ New Proposal
	☐ Resubmission of Proposal # _____
	☐ Continuation of Proposal # _____
	☐ Ph. D. Thesis

Principal Investigator: _____ Citizenship: _____
Institution & Address: _____
Phone: _____ Fax: _____ E-mail: _____

Co-Proposers (attach additional sheets if necessary)	**Institution & Mail Address**	**Citizenship**	**E-mail Address**

LANSCE Local Contact:

Flight Path/Instrument _____ Estimated Beam Time (days) _____
Dates Desired _____ Impossible Dates _____

For DOE reporting purposes, please categorize your proposal:

RESEARCH AREA (check all that apply)		**FUNDING AGENCY (check all that apply)**	
☐ Biological and Life Sciences	☐ Materials Science	☐ DOE/BES	☐ NSF
☐ Chemistry	☐ Medical Applications	☐ DOE/OBER	☐ Industry
☐ Defense Science	☐ Nuclear Physics	☐ DOE/DP	☐ NASA
☐ Earth Sciences	☐ Polymers	☐ DOE: _____	☐ NIH
☐ Engineering	☐ Solid State Physics	☐ DOD: _____	☐ Foreign: _____
☐ Environmental Sciences	☐ Other: _____	☐ Other US Gov't: _____	
☐ Instrument Development	☐ Other: _____	☐ Other: _____	

SAMPLE AND SAFETY DETAILS

Missing information may delay the safety review and potentially result in rejection of the proposal.

WNR/PROTON BEAM PARAMETERS

Target 2 (Blue Room proton beam)

Proton energy _____
Macropulse spacing _____
Proton beam spot size _____
Protons/micropulse _____
Micropulse spacing _____
Other _____

Target 4 (High energy neutron source)

Micropulse spacing _____
Neutron beam spot _____

LUJAN/INSTRUMENT CONFIGURATION

☐ Standard ☐ Nonstandard

Description of Sample

Chemical formula _____

Crystallographic Information - Space Group (if applicable)

a= _____ (Å alpha= _____ (°
b= _____ (Å beta= _____ (°
c= _____ (Å gamma= _____ (°

Size/Weight _____

How will sample be transported?

☐ Hand carry ☐ Mail, UPS, Fedex ☐ Other

Explain _____

RESOURCES NEEDED/SPECIAL REQUIREMENTS

☐ Sample Preparation _____ ☐ Mechanical Preparation _____
☐ Chemical Preparation _____ ☐ Sample Storage _____
☐ Computer Requirements _____ ☐ Sample Environment _____
☐ Health Physics _____ ☐ Other: _____

SAMPLE SAFETY ISSUES ***attach MSDS for each material**

☐ **No major safety issues** ☐ Corrosive Material* ☐ Toxic Material* ☐ Cryogenic
☐ Flammable Material* ☐ Radioactive Material* ☐ Explosive Material ☐ High Pressure
☐ Carcinogenic* ☐ Biohazardous* ☐ Electrical ☐ Other: _____

I certify that the above information is correct to the best of my knowledge.

Signature _____ Printed name _____ Date _____

Safety and Feasibility Reviews ***(to be completed by LANSCE)***

Instrument responsible/Safety Screener_____ Date _____

No further procedures/reviews required **To be reviewed by Experiment Safety Committee**

Experiment Safety Committee _____ Date Reviewed _____

Move to _____ PAC Subcommittee_Recommended # of days _____ Recommended Instrument _____

Comments:

DETAILED STATEMENT OF THE EXPERIMENT OR PROPOSED RESEARCH

(Include scientific context; relevance of proposed experiment; why neutrons as opposed to other techniques; preliminary work performed using neutron scattering and other techniques; details of experimental approach. ***Only nuclear physics proposals may create additional pages as necessary****.)*

LANSCE Experiment Technical and Safety Worksheet

Proposal number:
Experiment title:
Experimental Area/Flight path/data room:
PI: Phone: E-mail:

BRIEF DESCRIPTION (what you are measuring and how - very brief)

BEAM PARAMETERS
( ) standard WNR (1.8 μs micropulse spacing, 100 macropulses/sec.)
( ) standard Lujan (20 Hz max. current)
( ) Proton beam in Area B, C
( ) Proton beam in Area A
( ) Other
( ) special requirements (please describe below):

TARGET SAMPLE MATERIALS (type and quantity or thickness)

Expected levels of activation, special handling and disposal after irradiation:

USER SUPPLIED EQUIPMENT
( ) NONE
( ) Other (please specify, include any electrical equipment not commercially available or that has been modified):

Data acquisition requirements:

FACILITY REQUIREMENTS OR MODIFICATIONS

( ) STANDARD CONFIGURATION

( ) collimation	( ) electrical	( ) cooling
( ) interlocks	( ) controls	( ) air
( ) alarms	( ) shielding	( ) vacuum
( ) shutters	( ) beam lines	( ) other

Please provide details for all checked items:

HAZARD INVENTORY (Items identified below may require an SOP, SWP, or RWP)

( ) NONE	
( ) explosives	( ) radioactive material or sources
( ) lasers (> 50 mW)	( ) energized electrical equipment (exposed conductors)
( ) liquid or solid hydrogen	( ) other cryogens
( ) compressed gases	( ) vacuum or pressure vessels
( ) heat or flame	( ) radioactive waste
( ) hazardous or toxic waste	( ) chemical or biological hazards
( ) crane or forklift operations	( ) high electro-magnetic fields
( ) other	

Please provide details for all checked items:

List waste that may be generated as a result of this experiment. Detail storage and disposal path:

SPECIAL INSTRUCTIONS (List applicable HCPs, SOPs, RWPs or other ES&H permits - supply copies)

( ) NONE - standard Facility procedures only

( ) SPECIAL (provide details below):

LIST ALL PERSONNEL COMING TO LANSCE FOR EXPERIMENT

	Name	Affiliation	Citizenship
1.			
2.			
3.			
4.			
5.			
6.			

Screening action:

❑ Low Experimental Review level

Experiment is ❑ Approved with assigned residual risk of_____

❑ Disapproved

❑ Medium Experimental Review level

❑ High Experimental Review level

_____ _____

Screener Signature Date

_____

Approving Authority **Date**

The approval to conduct this work expires on _____.

LANSCE Safety Experiment Approval Form

Proposal number:
Experiment title:
Flight path/data room:
PI: Phone: E-mail:

Experiment Review Level: ❑ Low ❑ Medium ❑ High

Experiment Residual Risk: ❑ Minimal ❑ Low ❑ Medium ❑ High

Upon review of the information submitted, the experiment listed above is:

❑ Approved. Work is limited to that described in your proposal and subject to our normal operating procedures and any additional controls specified.

❑ Approved with conditions. Work as described may proceed contingent on the following additional requirements: _____

_____

_____

❑ Disapproved.
Explanation: _____

_____

_____

Approval above constitutes authorization of the work under Safe Work Practices. Worker authorization must come from a worker's line management. No LANL worker may perform work unless authorized. PIs are responsible for ensuring that participating workers have been authorized.

LANSCE management/operations shall be notified of changes to the experiment to ensure continued compliance with regulatory, safety, and operational requirements.

_____

Safety Screener / Area Manager **Date**

_____

Approving Authority **Date**

The approval to conduct this work expires on _____

LANSCE Provisional Experimental Area & Responsibility Assignments

LANSCE-12

Group Leader: Joyce Roberts

Lujan Center Area Manager: Roger Klaffky

Instrument	Instrument Responsible*	Org
FP1 NPD	Mark Bourke	LANSCE-12
FP2 SMARTS	Mark Bourke	LANSCE-12
FP3 HIPD	Bob Von Dreele	LANSCE-12
FP4 HIPPO	Bob Von Dreele	LANSCE-12
FP5	Bruce Takala/Walt Trela	LANSCE-3
FP6 SCD	Yusheng Zhao	LANSCE-12
FP7 FDS	Juergen Eckert	LANSCE-12
FP8 HELIOS	Not Used	
FP9 SPEAR	Greg Smith/Mike Fitzsimmons	LANSCE-12
FP10 LQD	Rex Hjelm	LANSCE-12
FP11a	Bruce Takala	LANSCE-3
FP11b UCN	Bruce Takala	LANSCE-3
FP12	Dave Bowman	P-23
FP13	Ferenc Mezei	LANSCE-DO
FP14 DANCE	John Ullmann	LANSCE-3
FP15 PCS	Benno Schoenborn	LS-DO
FP16 PHAROS	Rob Robinson	LANSCE-12

LANSCE-3

Group Leader: Steve Wender

WNR Area Manager: Bruce Takala

Instrument	Instrument Responsible*	Org
Target-2/All flight paths	Bruce Takala	LANSCE-3
4FP15L	John Ullmann	LANSCE-3
4FP30L	Steve Wender	LANSCE-3
4FP90L	Bob Haight	LANSCE-3
4FP15R	Steve Wender	LANSCE-3
4FP30R	Bob Haight	LANSCE-3
4FP60R	Ron Nelson	LANSCE-3

LANSCE-7

Group Leader: Dick Werbeck

Area B, C Area Manager: Steve Cushing

Instrument/FP	Instrument Responsible	Org
Area C	John Zumbro	P-25

*The Instrument Responsible will be designated in the Flight Path Responsibilities Memorandum of Understanding